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The Social Connectedness of Older Adults: A National Profile*

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Abstract

For decades, scholars have wrestled with the notion that old age is characterized by social isolation. However, there has been no systematic, nationally representative evaluation of this possibility in terms of social network connectedness. In this paper, the authors develop a profile of older adults' social integration with respect to nine dimensions of connectedness to interpersonal networks and voluntary associations. The authors use new data from the National Social Life, Health, and Aging Project (NSHAP), a population-based study of non-institutionalized older Americans aged 57–85 conducted in 2005–2006. Findings suggest that among older adults, age is negatively related to network size, closeness to network members, and number of non-primary-group ties. On the other hand, age is positively related to frequency of socializing with neighbors, religious participation, and volunteering. In addition, it has a U-shaped relationship with volume of contact with network members. These findings are inconsistent with the notion that old age has a universal negative influence on social connectedness. Instead, life course factors have divergent consequences for different forms of social connectedness. Some later life transitions, like retirement and bereavement, may prompt greater connectedness. The authors close by urging increased dialogue between social gerontological and social network research.

INTRODUCTION

Much has been made of the prospect of social isolation in later life. Several perspectives depict old age as a time of loneliness and rolelessness. A classic statement in this vein is Cumming and Henry's (1961) warning about older adults' irreversible descent into isolation through voluntary social disengagement. Subsequent work has challenged such accounts repeatedly by portraying aging in later life as an identity struggle, a constant effort to maintain social roles and activity in the face of difficult later-life transitions (Atchley 1989; Moen, Dempster-McClain, and Williams 1992; Neugarten, Havighurst, and Tobin 1968; Thoits 1992). Since this effort is crucial in maintaining older adults' mental and physical well-being, social gerontologists view social integration as a key component of "successful aging" (Rowe and Kahn 1998).

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Work on this topic has been moving away from conceptualizations of social integration which focus on roles and activities in favor of more network-oriented treatments (Antonucci and Akiyama 1995; Crosnoe and Elder 2002; Lang and Carstensen 1994; Morgan 1988; Shaw et al. 2007). Unfortunately, information about older adults' integration through social networks is available only in small pieces – through research which is outdated or which examines only one or a few network measures at a time. Our goal here is to provide a comprehensive, up-to-date description of older adults' social integration from a networks perspective. We develop this profile using new data from the National Social Life, Health, and Aging Project (NSHAP), a NIA-funded, population-based study of 3,005 older Americans, ages 57–85 conducted in 2005–2006. We consider five dimensions of interpersonal social network connectedness (egocentric network size, volume of social interaction with and closeness to network members, as well as network composition and density) and four dimensions of integration in the community (frequency of neighborly socializing, religious participation, volunteering, and organized group involvement) which are thought to be crucial for healthy aging. We also consider the potential roles of life course factors, such as retirement and bereavement, as well as health, in associations between age and social connectedness.

We find that, contrary to the popular notion of social isolation in later life, older Americans are well-connected. The oldest adults in our sample do have slightly smaller networks which contain more primary group members. Yet, their networks are no more or less dense than others', and they have more contact with core confidants. Furthermore, these individuals tend to be more involved in the community. The life course framework is useful in interpreting these associations. In particular, retirement and bereavement partially account for a curvilinear relationship between age and volume of contact with network members, as well as the positive association between age and involvement in the community. At the same time, good health appears to be crucial for community involvement. Overall, our findings suggest that the popular image of older adults as socially isolated has little empirical value. We discuss how future research may help clarify causal mechanisms linking life transitions and health to social network connectedness. This will be especially useful in understanding why life course factors like bereavement have opposite implications for connectedness in interpersonal networks versus ties to voluntary associations, which are highly interdependent forms of connectedness.

(HOW AND WHY) ARE OLDER ADULTS SOCIALLY ISOLATED?

The idea that old age is associated with social isolation is not new. Modernization approaches point to the breakdown of the traditional extended family and note the accompanying decline in the status of older adults (Burgess 1960; Cowgill 1986). This perspective is reinforced by the work of scholars like Townsend (1981), who emphasize modern public policies and programs (e.g., early retirement) which imply a devaluation of older adults. A classic social-psychological statement is social disengagement theory (Cumming and Henry 1961), which holds that older adults' isolation results from a gradual and irreversible abandonment of social roles, narrowing role sets, and the weakening of existing social bonds.

In response to these unflattering accounts of older adults, social gerontologists use the life course perspective (Elder 1985; George 1993) to underscore the implications of later-life challenges for older adults' social integration. Contrary to the image of older adults as either helpless victims of modernization or authors of their own isolation, this line of research portrays older adults as resilient to potentially isolating events like retirement and bereavement. Activity theory notes that older adults who adjust to later-life transitions by remaining socially active are happier and healthier (Cavan et al. 1949; Lemon, Bengtson, and Peterson 1972). Similarly, continuity theory argues that people become accustomed to certain social roles and social activities throughout their lives, and that older adults attempt to maintain them through many transitions (Atchley 1989; Rowe and Kahn 1998; Thoits 1992).

Social Networks, Later-Life Transitions, and Successful Aging

As suggested above, social roles and activity are central in treatments of successful aging (Atchley 1989; Baltes and Baltes 1990; Moen, Dempster-McClain, and Williams 1992; Neugarten, Havighurst, and Tobin 1968; Thoits 1992). Some scholars have broadened the meaning of social integration by combining the emphasis on roles and activities with a concern for social network connectedness (Antonucci and Akiyama 1995; Crosnoe and Elder 2002; Lang and Carstensen 1994; Morgan 1988; Shaw et al. 2007). Social networks are essential to successful aging because they provide embeddedness in systems of norms, control, and trust (Coleman 1988), access to information and other resources, and social support (Antonucci and Akiyama 1995). These resources are crucial for well-being (House, Landis, and Umberson 1988), making them especially valuable to older adults. While a great deal of work has explored the relationship between age and social integration with regard to social roles and activity, it is unclear to what extent age relates to a range of measures of social network connectedness, or how these particular associations are informed by life course factors like retirement and bereavement. The following sections review research that may shed light on these issues.

Interpersonal social networks—There are several aspects of social network connectedness that may contribute to successful aging. Having numerous direct ties to people (i.e., having a large "egocentric" network) gives people alternative routes to valuable resources, increasing their chances of receiving support when it is needed. Therefore, those who have larger networks tend to have better health (e.g., Berkman and Syme 1979), especially when interaction with network members is frequent (Lin, Woelfel, and Light 1985; Terhell, van Groenou, and van Tilburg 2007). Some types of social ties may be more beneficial than others. High-quality relationships are more likely to provide older adults' with a sense of belongingness, and are associated with better self-esteem and well-being (Fiori, Antonucci, and Cortina 2006; Wellman and Wortley 1990). Relatedly, many researchers highlight the value of kin relations, which are most likely to provide unconditional social support (Antonucci and Akiyama 1995; Hurlbert, Haines, and Beggs 2000).

Although it is often neglected in network-oriented treatments of social integration, the extent of egocentric network members' connectedness to each other is also important for older adults. Higher-density networks (in which one's network members know each other) constitute close knit social contexts in which one's contacts can triangulate information, share caregiving duties, and pool resources. Network density is associated with greater access to and more frequent activation of informal support, and therefore may have unique health benefits (Haines, Hurlbert, and Beggs 1996; Hurlbert, Haines, and Beggs 2000; Kelley-Moore et al. 2006).

Research suggests that adults' egocentric social networks shrink as they age (e.g., Marsden 1987; McPherson, Smith-Lovin, and Brashears 2006), even within older adult samples (Ajrouch, Blandon, and Antonucci 2005). On the other hand, most research suggests that age is positively associated with the presence of higher-quality relationships. For example, older adults tend to interact more with supportive contacts and have more kin-centered networks (Marsden 1987; Shaw et al. 2007; c.f., McPherson, Smith-Lovin, and Brashears 2006). Furthermore, some scholars argue that older people shed less meaningful, more superficial relationships as they age because they prefer to surround themselves with emotionally close contacts (Frederickson and Carstensen 1990). These processes also imply that older adults have denser social networks.

Some work suggests that life course factors play a major role in shaping older adults' egocentric social networks. While there is contradictory evidence concerning the effects of bereavement on contact with network members, retirement and poor health appear to decrease it, especially for men (Ferraro 1984; Hatch and Bulcroft 1992; van Tilburg and van Groenou 2002). Life transitions may also affect network composition. Retirement reduces contact with non-family,

and kin ties are more likely to stick through older adults' health declines out of a sense of obligation. At the same time, widowhood eliminates access to perhaps the most rewarding of all social ties. Thus, it is unclear whether age will be positively or negatively associated with access to higher-quality contacts among older adults.

Community involvement and voluntary associations—Community involvement and civic engagement are forms of "activity" which contribute to successful aging. These forms of social integration are also crucial to the development of inter-associational networks within the community (Cornwell and Harrison 2004; McPherson 1982). Social network research suggests a high level of interdependency between interpersonal network structure and ties to voluntary associations. People who have larger interpersonal social networks are more involved in voluntary associations (McPherson, Popielarz, and Drobnic 1992; Rotolo 2000; Wilson and Musick 1997). Furthermore, voluntary associations and other social groups provide opportunity structures for establishing interpersonal relationships (Feld 1981; McPherson and Smith-Lovin 1987; McPherson, Smith-Lovin, and Cook 2001).

But there are also good reasons to distinguish between interpersonal and community-based forms of social connectedness. First, the implications of connectedness to the community for older adults' successful aging may differ from the implications of connectedness in interpersonal networks, as the types of social resources available from individuals differ from those available from groups. Second, associational and more interpersonal forms of connectedness may present competing demands for time and energy (Sundeen 1990). Finally, the processes that shape older adults' connectedness to the community may differ from those that shape interpersonal networks. Social activity outside the home may require higher levels of commitment to social integration than interaction with network members (which can take place within one's home and over the phone), especially for older adults who suffer from debilitating health problems.

For these reasons, it is important to examine older adults' connectedness to the broader community through their involvement with neighbors and various types of organizations. Aside from household members, a person's neighbors are their most proximate social contacts. Having strong ties to neighbors facilitates access to informal aid, reduces sense of isolation, and may attenuate negative impacts of neighborhood disorder or disadvantage on health (Browning and Cagney 2002; Campbell and Lee 1992; Shaw 2005). In particular, religious participation, organized group involvement, and volunteering are all noted for their health benefits (Benjamins 2004; Ellison et al. 2001; Li and Ferraro 2006; Musick and Wilson 2003; Thoits and Hewitt 2001). Religious institutions may be a particularly effective avenue of integration into the community, as they are central in local networks of voluntary associations (Beyerlein and Hipp 2006; Cornwell and Harrison 2004; McIntosh, Sykes, and Kubena 2002).

Most work shows that older adults are more involved in the community than younger adults, especially with respect to volunteering and religious participation (Chatters, Taylor, and Lincoln 1999; Miller and Nakamura 1996). Some argue that this has to do with generational differences in values of civic commitment, while others point to life course factors (Putnam 2000; Rotolo and Wilson 2004; Wilson 2000). With respect to the latter, some see older adults' greater involvement as an adaptive response to narrowing role sets (see Cavan et al. 1949; Lemon, Bengtson, and Peterson 1972). Bereavement and retirement may increase volunteering, but there is mixed evidence for this (Ferraro 1984; Li 2007; Mutchler, Burr, and Caro 2003; Wilson and Musick 1997). Health also may be crucial to formal volunteering (Ainlay, Singleton, Swigert 1992; Li and Ferraro 2006; Thoits and Hewitt 2001). Overall, then, it is unclear how age relates to community involvement. On one hand, retirement and bereavement reduce competing demands and obligations, and may prompt compensatory

participation. On the other hand, these transitions reduce social capital and therefore complicate entrée into new social groups. Furthermore, health declines may reduce contact with the community.

In general, the literature suggests that the association between age and social connectedness in interpersonal networks and voluntary associations is complex, and depends on several life course factors. This picture runs counter to the image of universal social isolation offered by early research on disengagement. However, it is based on evidence cobbled together from numerous sources, making it difficult to make definitive or sweeping claims about older adults' social connectedness. There is a lot of research on individuals' network connectedness in general, but most of this work considers adults of all ages. Work that does focus on older adults usually examines only one or two measures of social connectedness at a time(for exceptions, see Adams and Blieszner 1995; Shaw et al. 2007), and researchers rarely examine interpersonal network connectedness and voluntary associations at the same time. This is partly due to the fact that comprehensive, representative data on older adults' social connectedness are scarce. Our goal, then, is to develop a comprehensive profile of both interpersonal and community-based forms of social connectedness from a large sample of non-institutionalized older adults. We examine nine measures of social connectedness using a recent, nationally representative sample of older American adults between the ages of 57 and 85. We examine how these measures relate to age, and assess the extent to which these relationships are shaped by life course factors.

DATA AND METHOD

We use data from the National Social Life, Health, and Aging Project (NSHAP), a nationally representative, population-based study funded by the National Institutes on Health and conducted by the National Opinion Research Center (NORC) at the University of Chicago. The study consists of interviews with 3,005 non-institutionalized older adults, conducted between autumn 2005 and spring 2006. The sample was selected from a multi-stage area probability design screened by the Institute for Social Research (ISR) for the Health and Retirement Study (HRS). From the HRS sample surplus, NSHAP selected 4,400 potential respondents, ages 57–85. The original HRS design oversampled by race/ethnicity. NSHAP retained this design and also oversampled by age and gender to produce approximately equal cell sizes by gender across three age categories. The final response rate is 75.5%.

NSHAP collected extensive information about respondents' egocentric social networks and community involvement, as well as partnership history, sexual activity, physical and mental health, health-related behaviors, medication use, and biomeasures.[1] Most of the data for the NSHAP study were collected during a two-hour in-home interview. To minimize the length of the in-home portion of the study, some questions were asked via a paper questionnaire that interviewers left behind for respondents to complete and mail in at their leisure. The return rate for the leave-behind questionnaire (LBQ) was 84 percent. Measures of social connectedness, life course factors, and other variables used in the analysis are described in Table 1.

Social Connectedness

We examine nine forms of social connectedness among older adults. We draw measures of egocentric network connectedness from NSHAP's social network module. Interviewers asked older adults to list people with whom they discuss "things that were important to you."[2] This question elicits names of strong, frequently accessed, long-term contacts (Marin 2004;Ruan 1998) – ties through which normative pressures and social influence are likely to operate (Burt

[1]Additional information about the NSHAP study can be found at: http://www.norc.org/NSHAP.

1984). Respondents could name up to five people, but also indicated if they had more than five discussion partners, where applicable. These data provide the basis for our measures of older adults' egocentric network size, volume of contact with network members, emotional closeness to network members, network composition, and network density. We also inquire about the frequency with which respondents engage in four types of community involvement: socializing with neighbors, religious services attendance, volunteering, and organized group involvement. The exact wording of questions is provided in Table 1.

Life Course Factors

As discussed above, several life course factors may affect the relationship between age and social connectedness among community-dwelling older adults. These include retirement, bereavement, and health problems. We include a dichotomous measure of whether the respondent is retired, as well as an indicator of bereavement – specifically, widowhood. We also control for whether respondents have never been married. We include two measures of health. The first gauges functional health (the ability to move about and complete everyday tasks), which may be especially relevant to community involvement.[3] The second is an ordinal measure of overall self-rated health, which captures more subjective aspects of well-being that could impact social connectedness (Thoits and Hewitt 2001).

Age

We are mainly interested in age, so we were careful to test alternative operationalizations of age in our analyses. Age ends up being modeled linearly in most analyses. In the case of closeness to network members, age interacts with frequency of contact with network members – as one might expect, given that both closeness and frequency of interactions are weakly/moderately correlated measures of tie strength. In the case of contact volume, the correct functional form of the age effect is curvilinear. These associations are discussed in greater detail below.

Controls

Other factors are likely to impact social connectedness and/or the relationship between old age and social connectedness. Sociodemographic factors include gender, race/ethnicity (measured using indicators of whether the respondent is African American and whether the respondent is Hispanic), and education (whether the respondent ever attended college).[4]

ANALYTIC STRATEGY

Our goal is to describe the social connectedness of older adults in the general population – to develop detailed profiles of connectedness at different ages – and to determine if there is any truth to the stereotypical image of older adults as isolated. We are limited by the cross-sectional

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[2]The name generator used to identify network members is:
From time to time, most people discuss things that are important to them with others. For example, these may include good or bad things that happen to you, problems you are having, or important concerns you may have. Looking back over the last 12 months, who are the people with whom you most often discussed things that were important to you?
Respondents' interpretations of what is "important" varies, as does the content of discussion with different alters (Bearman and Parigi 2004; Straits 2000). These variations do not impact many of the characteristics of the networks being described (Bailey and Marsden 1999). Research suggests that the survey content which precedes the social network name generator can affect interpretations of the item, as well as the number of alters named (McPherson, Smith-Lovin, and Brashears 2006; Sudman, Bradburn, and Schwarz 1996). NSHAP was designed so that the name generator appeared first, so interview order should not be an issue here.

[3]This is measured using an index ($\alpha = .86$) of self-reported difficulty completing nine ADLS and IADLs. These include: walking one block, walking across a room, dressing, bathing or showering, eating (such as cutting up food), getting in and out of bed, using the toilet (including getting up and down), driving a car during the day, and driving a car at night.

[4]NSHAP does not measure years of education. It records number of grades completed for those without a high school diploma, and number of years of college, if any. Combining these does not translate exactly into total years of education and creates missing data. The college indicator works as well as other education indicators (e.g., less than high school).

nature of the data in that we cannot directly assess how life transitions or processes of adaptation unfold over time. The data also make it difficult to develop definitive causal models or to distinguish between age and cohort effects (both of which are likely to come into play). Therefore, we do not focus on building causal models.

Multivariate regression techniques are useful, however, for generating refined estimates of social connectedness at different ages. We first regress each of the nine measures of social connectedness on age to get a sense of bivariate associations. Controls are added in the second model. We present adjusted Wald tests which show whether including the life course factors (net of other controls) alters the estimate of the association between age and each measure of social connectedness. This allows us to assess the extent to which associations between age and social connectedness are related to associations between age and other age-related factors, like health.

The measures of social connectedness lend themselves to different forms of regression. Social network size is measured as a count of the number of people the respondent identifies as a discussion partner, and it is capped at "six or more." We model it using ordered logit regression (Agresti 2002).[5] Volume of interaction with network members is a count of the number of days per year the respondent interacts with network members. Given evidence of overdispersion, we use negative binomial regression for this variable (network size is used as the exposure variable). OLS works fine for modeling respondents' average closeness to network members. Poisson can be used for modeling number of primary group members (network size is the exposure). Number of relationships among network members is overdispersed, so negative binomial is more appropriate there (number of possible ties among network members is the exposure). Measures of neighborly socializing, religious attendance, volunteering, and group involvement are all ordinal, so we employ ordered logit regression in each of these cases.[6] Appendix Table A1 describes the analysis of each measure, including the type of statistical model used and a full enumeration of controls used in each case. All models include weights to account for differential probabilities of selection (with post-stratification adjustments for non-response), and take into the clustering and stratification of the sample design.

FINDINGS

Interpersonal Social Networks

The mean egocentric network size of the older adults in our sample is 3.6, but the modal network size is 5. These are relatively large networks compared to the average network sizes reported for adults of all ages in McPherson, Smith-Lovin, and Brashears (2006). Table 2 shows results of generalized ordered logit models of network size. The β estimate for a given covariate reflects the increment in the log(odds) that a case falls above a given network size level that corresponds to a one-unit increment in that variable.[7] We present the estimates predicting larger network sizes, as these levels are most typical of the sample.

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[5]Since the dependent variable has seven possible levels, there will be six separate intercepts associated with the cumulative probabilities – $\gamma 1$, $\gamma 2$, $\gamma 3$, $\gamma 4$, $\gamma 5$, and $\gamma 6$ – of observing successively larger networks. Most ordered logit models make the assumption that the odds ratio estimates of the independent variable are the same at each intercept (the "proportional odds" assumption).In this case, one simply substitutes a different intercept to calculate odds associated with observing a given level of the dependent variable. Here, though, the proportional odds assumption is violated, so we use generalized ordered logit (partial proportional odds) models (Williams 2006) instead, which allow estimates to vary across levels.

[6]Likelihood ratio tests suggest that the proportional odds assumption does not hold for models of neighborly socializing (χ^2 (48) = 145.76, p < .001) or religious attendance (χ^2 (90) = 203.03, p < .001), but it does hold for models of volunteering (χ^2 (75) = 82.86, p = .26) and organized group involvement (χ^2 (75) = 80.35, p = .32). Therefore, generalized ordered logit estimates from partial proportional odds models (using gologit2 in Stata) are presented for the first two.

[7]Some variables, like age, race/ethnicity, widowhood, and health have the same relationship across levels of network size (and thus are constrained to have parallel effects across cutoffs). The estimates of the other coefficients depend upon the level of network size being considered.

The first model (represented in columns 1, 3, and 5) shows that the oldest adults in the sample have the smallest networks. The inclusion of sociodemographic, life course, and health variables (columns 2, 4, and 6) fails to render this association non-significant. Older adults are about 86 percent as likely as those ten years younger than them (e.g., 85-year-olds versus 75-year-olds) to have larger networks ($e^{-.150} = .861$). The probability that a 57-year-old has more than four network members is .60, compared to .49 among 85-year-olds. These results (see Figure 1) are consistent with perspectives which predict a decline in interpersonal connectedness in later life. Women, non-African-Americans, non-Hispanics, college-educated persons, parents, those who have retired, and those who are not bereaved and who have marital histories all tend to have larger networks. However, considering life course and health factors does not significantly alter the association between age and network size, suggesting that other factors may be responsible for the fact that the oldest adults have smaller networks.

Table 3 presents models of the other four forms of interpersonal network connectedness. Models of volume of contact with network members are shown in columns 1 and 2. They suggest that age is significantly related to contact volume among older adults. As shown in Figure 2, this relationship is represented by a U-shaped curve.[8] Contact volume declines as we move through the young-old group, flattens out through the old-old, and increases in the oldest-old age group. For example, among 57-year-olds, there is a predicted average of about 196 days of contact per year, per network member, compared to 187 days of contact among 70-year-olds, and 198 among 85-year-olds.

This U-shaped pattern may reflect challenges faced by older adults at different ages. Contact volume may be lower among the young-old because social roles begin to dissipate around this time. In the old-old age group (people in their late sixties and early seventies) contact volume bottoms out. The greater volume seen among the oldest-old may reflect an increase in interaction that follows adaptation to the loss of social roles, friends, or family members. There is limited evidence for this. Considering retirement, bereavement, and health alters the association between age (and age-squared) and contact volume. This shift is illustrated in Figure 2. The curvilinear relationship becomes less pronounced, suggesting that these factors explain a substantial portion of the association between age and connectedness to network members.

Other factors inform older adults' contact with their network members. Contact is greater among women, African Americans, Hispanics, those with less education, and non-retirees. Network structure and composition are also relevant. Older adults whose partners are in their network and who are close to their network members report more contact. Widowed persons and those who are in worse health also report more contact. This may reflect increased monitoring by and social support from network members, but we cannot test this idea directly.

Note also that those who live with a larger proportion of their network members have more contact with them. It is possible, then, that changes in household composition, such as the oldest-old moving in with their children, are driving the pattern in Figure 2. This does not appear to be the case, however. In fact, not controlling for proportion of co-residing network members flattens the relationship between age and contact volume, suggesting that the oldest-old have greater contact with their network members despite the fact that they are less likely to co-reside with them. This lends further support to an adaptation or compensation model.

[8]Predicted values for all forms of social connectedness are calculated using parameter estimates from the final full models (see Appendix Tables A2 and A3, which are expanded versions of Tables 3 and 4, respectively, displaying all parameters). For variables in the equation, mean values are used for continuous variables and values for unordered variables are set to modal categories. Therefore, most figures are based on predicted values for non-African-American, non-Hispanic, college-educated women who are currently married and retired.

The analysis of closeness to network members (columns 3 and 4) shows that the oldest respondents are less close to their network members. A ten-year increment in age is associated with a .06 decrement in closeness to network members. This is not reflected in the estimate shown in Table 3, which is tied up in an interaction.) This is not a large substantive association, but it is enough to question the argument that older adults prefer closer contacts (Fredrickson and Carstensen 1990). Furthermore, this association is unaffected by life course factors. Overall, women, non-Hispanics, those with smaller networks and who live with many of their network members, retired persons, people who have been married, and healthier respondents all tend to be closer to their network members.

The association between age and closeness depends on older adults' frequency of interaction with their network members. As shown in Figure 3, the negative association with age is strongest among those who have less frequent interaction (gauged at the 25th percentile) with their network members, and is virtually non-existent among those who have frequent interaction (the 75th percentile). These findings suggest that the oldest-old are less close to their network contacts when their frequency of contact with network members is low. This is in some ways consistent with the argument that older adults prefer interacting with close network members. However, this idea is best evaluated at the dyad level, which is beyond the scope of this paper.

Poisson models of network composition (columns 5 and 6) reveal that older adults tend to have more primary group members (spouse and children) in their core discussion networks. A ten-year increment in age is associated with a 6 percent increment in the number of network members who are primary relations (calculated as ($e^{\cdot 059}$–1)*100). Though modest, this estimate is consistent with the argument that the oldest adults' egocentric networks are more kin-centered. We cannot assess whether this pattern reflects preferences for primary group ties, the loss of irreplaceable friends and other confidants, or other factors. However, the association is not influenced by the introduction of life course and health factors (the latter suggesting that greater kin presence among the oldest-old is not an obligatory caregiving response by older adults' family members). Men, non-African-Americans, parents, those who have not been widowed, and respondents who have been married also have more primary group ties.

Negative binomial models of network density (the number of ties present among network members) are displayed in columns 7 and 8. There is no evidence that age is related to this aspect of older adults' social networks. This is interesting because it suggests that older adults do not necessarily prefer more close knit social environments, as implied by socioemotional selectivity theory. It also suggests that the oldest-old are just as likely as the young-old to maintain bridges between otherwise disconnected network members, which has implications for control over network resources (Burt 1992). In terms of life course factors, widowhood is associated with greater network density. This holds net of the strong association between proportion kin and network density, suggesting that dense networks are not an outgrowth of adaptive responses to widowhood. More than anything else, the density of older adults' social networks appears to be a product of other features of the network. Apart from the expectably positive association between proportion kin and network density, respondents whose spouse/partner is embedded within the network, those who live with their network members, and those who are closer to them all have denser networks. Women and less-educated older adults also tend to have more dense networks.

Community Involvement and Voluntary Associations

Results of the (generalized) ordered logit models of community involvement are presented in Table 4. For ease of interpretation and for the sake of consistency, we present estimates from the portion of each of these models that predicts *at least weekly* connectedness to the community.

A key finding is that the oldest adults are the most connected to the community. A ten-year increment in age is bivariately associated with a 29 percent increment in the odds of socializing with neighbors on a weekly basis. This relationship is no longer significant after controlling for other measures. There is evidence that the presence of alternative social contacts matters for neighborly socializing. Older adults who have fewer network members living in their household tend to have more interaction with their neighbors. The only relevant sociodemographic measure is ethnicity, with Hispanics reporting more frequent interaction with neighbors than non-Hispanics. In addition, retirement and widowhood are positively associated with neighborly socializing. Supplementary analyses show that if we remove these two factors alone from the final model, age has a significant relationship with frequency of neighborly socializing. This is illustrated in Figure 4, which shows the relationship between age and the predicted probability of weekly socializing with neighbors before and after controlling for life course factors. That life course factors account for the association between age and this form of community involvement may indicate that neighborly socializing is partly associated with life transitions.

Models of religious participation are shown in columns 3 and 4. Older adults are consistently more involved in this domain of community life as well. From the final model, a ten-year increment in age is associated with a 40 percent increment in the odds of attending religious services at least once a week. The predicted probability of weekly religious services attendance is .42 among the youngest respondents, and .65 among the oldest (see Figure 4). Supplementary analyses (not shown) reveal that the direction and magnitude of the association is similar before and after controlling for life course factors. Other factors that are associated with greater religious services attendance are being female or African American, having more contact with network members, and having a religious affiliation. Being Hispanic, college-educated, and having had children are all marginally associated with more frequent attendance as well. Also, those who have better functional health are more likely to attend religious services frequently (see Ainlay, Singleton, Swigert 1992).

The oldest adults in this sample are also more likely to volunteer frequently (columns 5 and 6). A ten-year increment in age is associated with a 20 percent increment in the odds of weekly volunteering. The predicted probability of a 85-year-old volunteering at least once a week is . 29, compared to a .20 probability for a 57-year-old. Women, African Americans, college-educated persons, people who do not have children, those who have larger networks and who have more interaction with their network members, those who have been married, and those who are retired are all more likely to volunteer frequently. These findings are generally consistent with compensation models of community participation. There also appears to be an important suppressor effect operating here. Consistent with recent work, volunteering appears to be dependent on health (Li and Ferraro 2006; Thoits and Hewitt 2006). Since older adults have poorer overall self-reported and functional health, taking these factors into account helps reveal the positive association between age and volunteering.

The final model suggests that the oldest-old are no more likely to participate frequently in meetings of organized groups than the younger-old (columns 7 and 8). Otherwise, similar factors inform this type of social connectedness as in the case of volunteering. Those who participate more frequently in organized groups are women (marginally), African Americans, college-educated respondents, those without children, and those who have been married. Furthermore, good overall self-rated and functional health appear to be crucial. Taking these factors into account does reveal a now-positive (but still non-significant) relationship between age and organized group involvement. Considering functional health alone significantly alters the association between age and organized group involvement ($F(1, 49) = 4.97$, $p < .05$). These results reiterate the importance of considering health in future models of community-based social connectedness.

CONCLUSIONS

How socially connected are older Americans today? Various theories have asserted that older adults are less integrated than younger adults because they are marginalized by modernization, because they are forced out of social roles by younger generations, because they seek solitude, or because they are more selective about their social contacts. Other work in social gerontology views older adults as more adaptive, noting that their social lives are determined through an ongoing struggle for identity and social relevance despite numerous later-life challenges. This is an important issue because social integration confers numerous benefits which are likely to be particularly valued by older adults – a group which is increasing in size.

Most recent social gerontological work has stressed older adults' social integration through social networks in particular. While the theoretical rationale for emphasizing older adults' network connectedness is well established, how well connected older adults actually are in this sense is not. Our analyses of a representative sample of older Americans suggests that old age is indeed related to several aspects of social network connectedness. The oldest-old have smaller social networks, are less close to network members, and have fewer non-primary group ties than the young-old. But age has a curvilinear relationship with volume of contact with network members among older adults, with both the young-old and oldest-old demonstrating greater volumes of contact than the old-old. There is no significant relationship between old age and network density or organized group activity. Finally, age is positively associated with frequency of neighborly socializing, religious services attendance, and volunteering in this group. We therefore find a more complex and nuanced profile of older adults' social lives than previous theories have anticipated.

Existing approaches do provide a useful starting point for understanding variation in older adults' social network connectedness. These perspectives may be reconciled to each other to the extent that increased connectedness in associational networks can be seen as a response to decreased connectedness in interpersonal networks. This finding mirrors theories which focus on the great amount of adaptation to change older adults must carry out (e.g., Utz et al. 2002). Interpersonal network ties are difficult to control and predict, since they are a product of both one's own and one's network members' behaviors and experiences. Older adults often must contend with sudden and irreversible changes to the character of their interpersonal networks. Close social network ties are not easily replaced. In this light, the greater involvement of the oldest adults in our sample in civic activities might be better understood not as an outcome of generational differences in commitment to community or civic spirit (Putnam 2000), but as an effort to regain control over one's social environment (Baltes and Carstensen 1996).

This insight has important implications for social network research on the link between connections to other individuals and ties to social groups. These two domains of social life are usually regarded as structurally interdependent. People who have larger interpersonal social networks usually are more involved in voluntary associations, and voluntary associations and other groups provide opportunity structures for establishing interpersonal relationships. The seeming disconnect between these two domains implied by the compensation model suggests that life course factors, such as bereavement, condition the association between interpersonal and associational network connectedness. This possibility has not been thoroughly evaluated in the social networks literature.

At the same time, social gerontological approaches to understanding older adults' social connectedness are less useful with respect to more seldom-studied aspects of social network connectedness, such as closeness to network members and network density. This is where the limits of existing frameworks are most noticeable. For instance, the finding that older adults have more primary group members in their social networks initially lends support to the claim

that older adults prefer closer relationships. Yet, when we actually analyze older adults' average closeness to their network members, we find that older adults are less close to these network members, casting doubt on findings from work which relies on measures of relationship type (e.g., kin versus non-kin) as a proxy for emotional closeness.

The relationships between life course factors – like retirement, bereavement, and health – and less-studied aspects of interpersonal social networks are poorly understood. Retirement relates to community involvement much in the same ways as bereavement does, but the two factors relate differently to measures of interpersonal network connectedness. The reasons for these differences are unknown. This, we feel, presents an excellent opportunity for sociologists to develop fresh approaches to linking life course theories and social network research.

Conditioning Factors

We are unable to identify the specific mechanisms that govern the apparent increase in associational involvement with age among older adults. The most common explanation is that this increase reflects an intentional adaptive response on the part of older adults who face interpersonal social loss. An alternative explanation is that interpersonal loss is often followed by developments which could affect one's connectedness to the community, such as changes in living arrangements (e.g., taking up residence in a retirement community), or even the increased outreach efforts of local organizations.[9] The extent to which such mechanisms come into play is likely to condition the impact of life course challenges on older adults' associational involvement in particular, but we are unable to evaluate these possibilities here.

Health also plays an important role. The extent to which an older person can adapt to and compensate for the loss of close ties by getting involved in the community, and the extent to which sociability is capable of driving such adaptation, may be conditioned by health. While older adults' close relationships with their friends and family may survive the challenges and demands posed by health problems, relations with local organizations and groups may suffer from problems of access caused by disability and severe illness. This is an issue on which sociological research, outside of the disabilities literature, is seriously lacking. While we understand a great deal about the impacts of social network connectedness on health, we are just beginning to understand the reverse process (see Ainlay, Singleton, Swigert 1992; Li and Ferraro 2006; Thoits and Hewitt 2001). Such investigations will undoubtedly need to develop more refined conceptualizations of health. Kinesthetic, sensory, and cognitive impairments, for instance, are likely to impact different aspects of network connectedness in different ways. Sorting out these effects may be crucial in efforts to fashion fresh approaches to linking the life course to social connectedness.

POTENTIAL SELECTION ISSUES

A legitimate concern for our descriptive account is that the positive associations between age and some forms of connectedness could reflect selection processes. There are three groups of people who are excluded from our sample: 1) those who have died; 2) those who are institutionalized; and 3) those who were drawn into the sample but did not participate. The primary purpose of our study is to describe the current population of community-residing older adults, and for this purpose, excluding people from the first two groups technically does not present a problem. These forms of "selection" hold in the general population of older adults as well, so findings from our sample merely reflect that more general social fact.

NSHAP's response rate of 75.5 percent is impressive for such a survey, but it nonetheless leaves some room for selection arising from non-response. Comparison of the distributions of

[9]We are indebted to an anonymous reviewer for urging us to consider alternative explanations.

other demographic characteristics (including marital status) among older adults, both to the 2005 American Community Survey and the 2002 Current Population Survey (see Appendix Table A4), suggests relatively little differential nonresponse. Selection due to social isolation may be a concern, but for contrasting reasons. More connected people may have less time for an interview, but they also may be more sociable and therefore more willing to participate. At the same time, some isolated individuals may be lonely and welcome the opportunity to talk with an interview, while others may avoid the contact.

It is interesting to speculate as to the potential impacts of institutionalization on the relationship between age and social connectedness among older adults. Indeed, dismissing institutionalized older adults altogether perpetuates neglect of an understudied population. Institutionalization matters for our estimates to the extent that it is linked to social connectedness. There is little research on social connectedness among the institutionalized population. But some work suggests that social isolation increases the risk of nursing home placement (Akamigbo and Wolinsky 2006; Pearlman and Crown 1992). Therefore, our estimates may be partly based on more socially connected older adults. But before worrying too much about potential selection caused by this, it is useful to get a sense of the severity of the problem. According to the 2000 U.S. Census (see Hetzel and Smith 2001), only 1.1 percent of people between 65 and 74 years of age were institutionalized in nursing homes, and this only increases to 4.7 percent among those between 75 and 84.

At the same time, some work implies that institutionalization is a *solution* for social isolation among older adults. Nursing homes typically encourage increased social connectedness among residents through communal dining, organized social activities, personal contact and caregiving – and they sometimes offer transportation to religious and other community events. Furthermore, some work suggests that older adults are better able to establish new relationships when they are surrounded by people their own age (Rosow 1967). Sample selection is only a threat if less socially connected adults are more likely to be institutionalized, and if that institutionalization also does not succeed in reintegrating older adults into a community. But these are unique populations, and it may be imprudent to compare social connectedness between institutionalized and non-institutionalized older adults. The meaning and character of social connectedness is likely to differ between these groups. Our opinion is that this very possibility should be a focus of future research in social gerontology.

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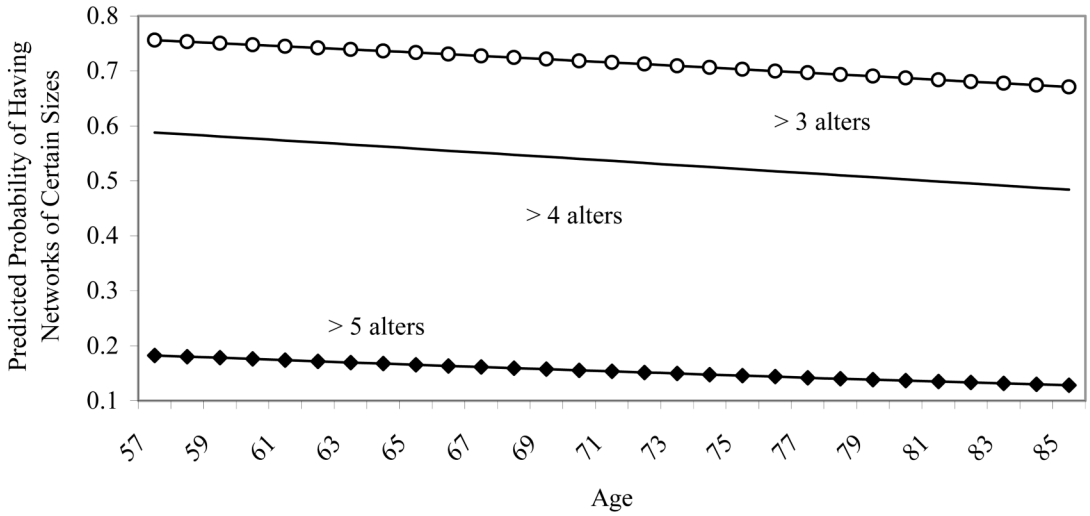

Figure 1. Predicted Network Sizes of Older Adults, by Age

Note: Predicted values are calculated using generalized ordered logit regression. Covariates are held at their mean values, and set to their modal values in the case of categorical predictors.

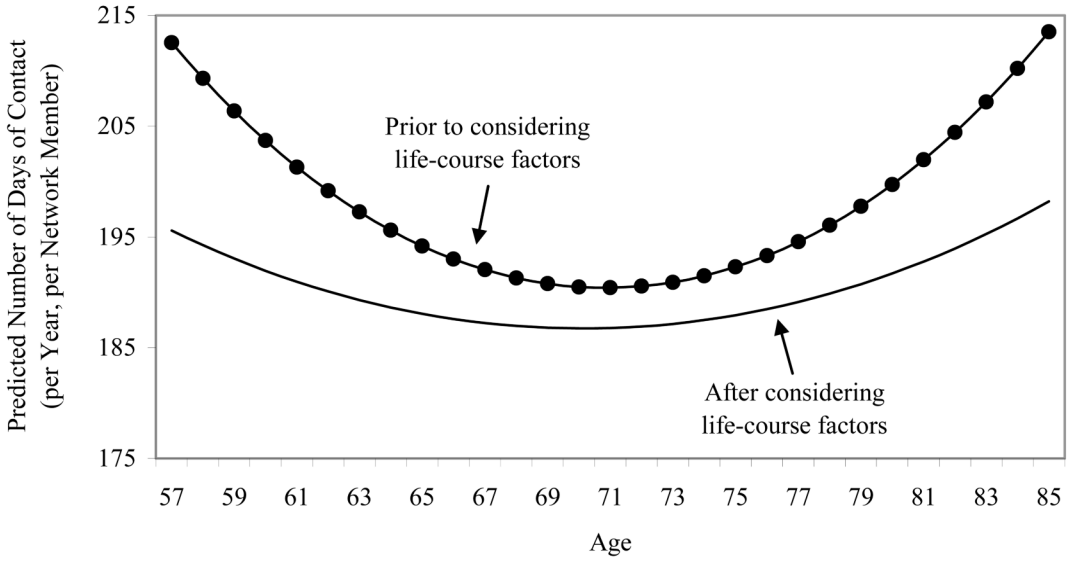

Figure 2. Older Adults' Predicted Volume of Interaction with Network Members, per Year, by Age, before and after Controlling for Life Course Factors

Note: Predicted values are calculated using Poisson regression. Covariates are held at their mean values, and set at modal values in the case of categorical predictors.

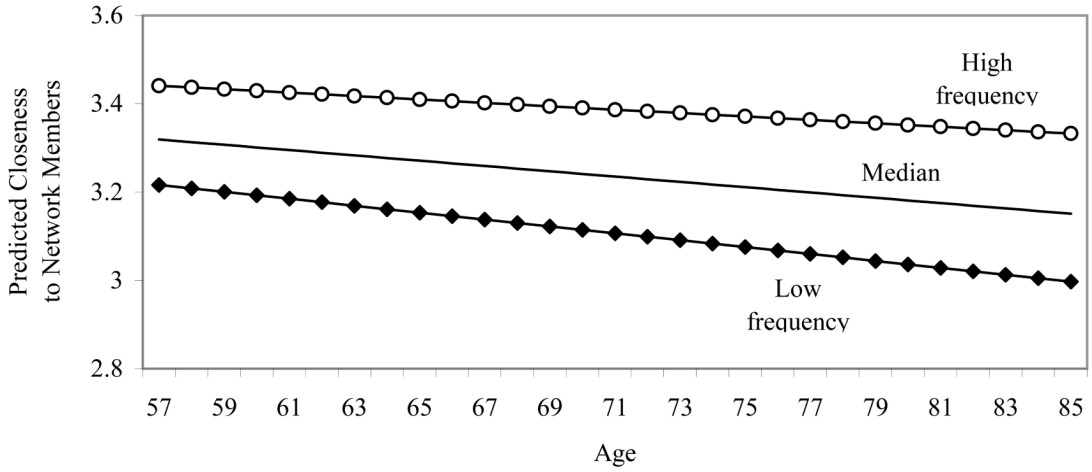

Figure 3. Predicted Levels of Closeness to Network Members among Older Adults, by Age, Given Different Degrees of Interaction Frequency with Network Members

Note: Predicted values are calculated using the OLS regression. Covariates are held at their mean values, and set at their modal value in the case of categorical predictors.

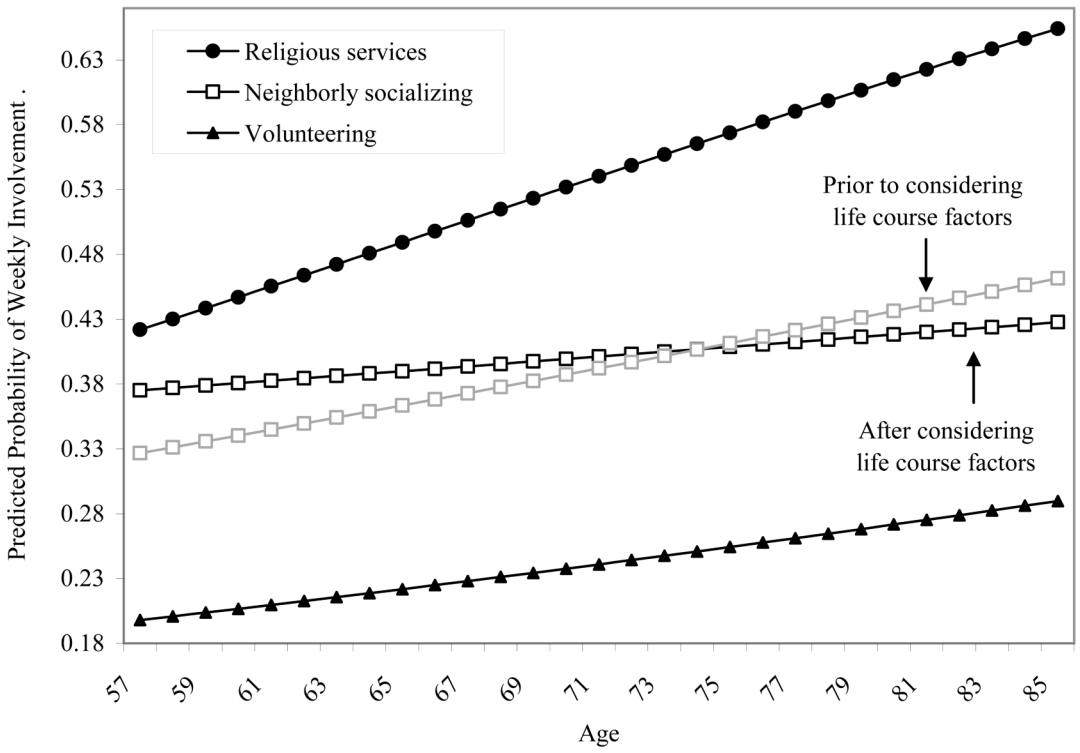

Figure 4. Older Adults' Predicted Probability of Weekly Involvement in Three Community-Oriented Social Activities, by Age

Note: Predicted values are calculated using (generalized) ordered logit regression. Covariates are held at their mean values, and set at their modal value in the case of categorical predictors. Predicted probabilities of weekly socializing with neighbors are presented both prior to and after controlling for bereavement, retirement, and health.

Table 1

Descriptions of Key Variables[a]

Variable		Weighted Mean	Standard Deviation
Network size	Number of people listed in respondent's core discussion network Range: 0 to ≥6	3.57	1.59
Volume of contact with network alters	Rs were asked how often they contact each alter. Eight possible responses range from "less than once a year" to "every day." We transform responses to estimates of number of days of contact per year with each alter (e.g., "every day" = 365). We then add estimates across alters to get overall contact volume. Range: 1 to 1,825.	692.99	354.91
Closeness to alters	Average response to: "How close do you feel is your relationship with [name]?" Responses range from "not very close" (= 1) to "extremely close" (= 4).	3.16	.54
Primary group members in net	Number of people listed in the network who are spouse, partner, or (step-)children. Range: 0 to 5.	1.63	1.26
Network density	Proportion of network members who know each other.	.85	.25
Neighborly socializing	"How often do you get together with any of [nearby neighbors who you know by name] just to chat or for a social visit?" Five responses, from "hardly ever" (= 1) to "daily or almost every day" (= 5).	2.35	1.28
Religious services attendance	"About how often have you attended religious services?" Nine possible responses, ranging from "never" (= 1) to "several times a week" (= 7).	4.27	2.11
Volunteer work	"In the past 12 months, how often did you do volunteer work for religious, charitable, political, health-related, or other organizations?" Seven responses, from "never" (= 1) to "several times a week" (= 7).	3.20	2.08
Organized group involvement	"In the past 12 months, how often did you attend meetings of any organized group?" Seven responses, from "never" (= 1) to "several times a week" (= 7).	3.66	2.15
Age (in decades)	Age of R, divided by 10. Range: 5.7 to 8.5.	6.80	.79
Female	Whether the respondent is female. {Yes = 1, no = 0}	.52	.50
Race	Whether the respondent is African American {Yes = 1, no = 0}	.10	.38
Ethnicity	Whether the respondent is Hispanic. {Yes = 1, no = 0}	.07	.31
Education	Whether the respondent attended college. {Yes = 1, no = 0}	.51	.50
Retirement	Whether the respondent is retired. {Yes = 1, no = 0}	.59	.48
Widowed	Whether the respondent is widowed. {Yes = 1, no = 0}	.17	.41
Never married	Whether te respondent was never married. {Yes = 1, no = 0}	.03	.19
Self-reported health	R's self-rating health. Range: "poor" (= 1) to "excellent" (= 5).	3.27	1.11
Functional health	R's self-rated ability to complete each of nine activities of daily living on their own. Four responses, ranging from "unable to do" (= 1) to "no difficulty" (= 4). Each item is standardized to a z-score, then all items are averaged together to form the scale (α = .86). Range: −5.42 to .39.	.05	.69

[a]Means incorporate person-level weights, with post-stratification adjustments for non-response. Estimates are calculated for all cases for which data are available.

Appendix Table A1

Details Concerning Multivariate Analysis of Social Connectedness Measures

Dependent Variable	Description	Regression Model	Additional Controls[a]
Network size	Ordinal	Generalized ordered logit	Number of children
Volume of contact w/network members	Count	Negative binomial[b]	Whether spouse/partner is in network, proportion of net members in household, average closeness to network members
Closeness to network members	Average of ordinal measures	Linear	Network size, whether spouse/partner is in network, prop. of net members in household, avg. frequency of contact w/net members, interaction b/w age & avg. freq of contact
Primary group members in net	Count	Poisson[b]	Number of children
Network density (i.e., number of ties among net members)	Count	Negative binomial[c]	Whether spouse/partner is in network, prop. of network members in household, average closeness to net members, proportion kin in network
Neighborly socializing	Ordinal	Generalized ordered logit	Number of neighbors R knows by name, number of children, net size, prop. of net members in household, volume of contact w/network members, inverse Mill's ratio[d]
Religious services attendance	Ordinal	Generalized ordered logit	Religious preference, number of children, net size, volume of contact w/net members, prop. of network members in household
Volunteer work	Ordinal	Ordered logit	Number of children, net size, volume of contact w/net members, prop. of network members in household, inverse Mill's ratio[d]
Organized group involvement	Ordinal	Ordered logit	Number of children, net size, volume of contact w/net members, prop. of network members in household, inverse Mill's ratio[d]

[a] Estimates for these variables are included in all final models, but are not shown to conserve space. All models also include: age, gender, race/ethnicity, education, retirement, widowhood and marital history, and self-rated health and functional health.

[b] Uses network size as the exposure variable.

[c] Uses number of possible alter-alter dyads (given the network's size) as the exposure variable.

[d] This variable is included as a control for selective non-response into the leave-behind questionnaire (LBQ), which is the source of information about neighborly socializing, volunteering, and organized group involvement. LBQ response is modeled using the core independent variables, cognitive function, and measures of respondent candor and difficulty. The control is the ratio of the probability density of a normal curve to its corresponding cumulative probability (derived from predicted probabilities).

Table 2

Log(odds) from Generalized Ordered Logit Regression Models Predicting Older Adults' Social Network Size (N = 2,967)[a]

Predictor	Network Size[b] > 3		> 4		> 5	
Age (in decades)	−.117* (.053)	−.150* (.072)	−.117* (.053)	−.150* (.072)	−.117* (.053)	−.150* (.072)
Female		.617*** (.082)		.524*** (.092)		.489** (.153)
African American		−.505** (.136)		−.505** (.136)		−.505** (.136)
Hispanic		−.901*** (.196)		−.901*** (.196)		−.901*** (.196)
Retirement		.294** (.096)		.286** (.104)		.493** (.151)
Widowhood		−.179* (.084)		−.179* (.084)		−.179* (.084)
Self-rated health		.065 (.039)		.065 (.039)		.065 (.039)
Constant	.936* (.370)	.031 (.469)	.256 (.368)	−.644 (.466)	−1.577*** (.390)	−2.668*** (.500)

† p < .10,

* p < .05,

** p < .01,

*** p < .001 (two-tailed tests)

[a] All models are survey-adjusted, and include controls for SES, marital history, functional health, and other predictors listed in Appendix Table A1.

[b] We use seemingly unrelated estimation to test whether including the life-course measures significantly alters the association between age and network size (using non-generalized survey-adjusted ordered logit models). Results suggest that the life-course factors do not alter the age estimate: F (1, 49) = .26 (p = .61).

Appendix Table A2

Unstandardized Coefficients from Regression Models Predicting Older Adults' Volume of Contact with and Closeness to Network Members, Network Composition, and Network Density (Full Version of In-text Table 3)[a]

Predictor	Volume of interaction with net members (visits per year) (Negative binomial)[b]		Closeness to net members (OLS)[c]		Number of primary group members in network (Poisson)[b]		Number of relationships among network members (Negative binomial)[d]	
Age (in decades)	−.456* (.210)	−.377† (.214)	−.057*** (.014)	−.121*** (.032)	.059** (.018)	.059** (.022)	−.006 (.007)	−.011 (.007)
Age^2	.030† (.015)	.027† (.015)						
Female		.069** (.020)		.126*** (.023)		−.120*** (.031)		−.036** (.012)
African American		.131*** (.033)		.041 (.029)		−.182** (.062)		−.011 (.020)
Hispanic		.104*** (.027)		−.074† (.038)		.186** (.060)		−.017 (.019)
College		−.096*** (.018)		.015 (.019)		−.029 (.023)		−.049** (.017)
Retirement		−.093*** (.022)		.066** (.023)		.028 (.035)		.018 (.012)
Widowhood		.117*** (.026)		.036 (.028)		−.166*** (.034)		.069** (.021)
Never married		−.000 (.071)		−.121† (.067)		−1.513*** (.258)		.038 (.049)
Number of children						.070 (.012)		
Self-rated health		−.018* (.008)		.045** (.012)		.019 (.012)		.010 (.008)
Functional health		−.016 (.017)		−.016 (.016)		−.036 (.025)		−.008 (.013)
Network size				−.020** (.006)				
Partner in network		.047* (.023)		.044 (.029)				.054** (.017)
Proportion of network members in household		.686*** (.035)		.181** (.062)				.191*** (.041)
Closeness to network members		.195*** (.017)						.073*** (.013)
Average frequency of contact w/ network members				−.000 (.001)				
Proportion kin in network								.379*** (.030)
Constant	7.050*** (.726)	5.905*** (.742)	3.540*** (.094)	3.380*** (.230)	−1.178*** (.122)	−1.339*** (.123)	−.147** (.050)	−.664*** (.072)
Δ of age estimate (F)[e] (d.f.)		21.70*** (2, 48)		2.25 (1, 49)		1.50 (1, 49)		7.36** (1, 49)
N	2,896		2,896		2, 900		2, 560	

† p < .10,

* p < .05,

** p < .01,

*** p < .001 (two-tailed tests)

[a] All models are survey-adjusted, and include controls for SES, marital history, functional health, and other predictors listed in Appendix Table A1.

[b] Number of network members is treated as the exposure variable.

[c] Note that this model also includes an interaction b/w age and avg. frequency of interaction w/net members.

[d] Number of possible relationships among network members, given network size, is treated as the exposure variable.

[e] Seemingly unrelated estimation test of whether including the life-course factors significantly alters the association b/w age and connectedness.

Table 3

Unstandardized Coefficients from Regression Models Predicting Older Adults' Volume of Contact with and Closeness to Network Members, Network Composition, and Network Density[a]

Predictor	Volume of interaction with net members (visits per year) (Negative binomial)[b]		Closeness to net members (OLS)[c]		Number of primary group members in network (Poisson)[b]		Number of relationships among network members (Negative binomial)[d]	
Age (in decades)	−.456* (.210)	−.377† (.214)	−.057*** (.014)	−.121*** (.032)	.059** (.018)	.059** (.022)	−.006 (.007)	−.011 (.007)
Age^2	.030† (.015)	.027† (.015)						
Female		.069** (.020)		.126*** (.023)		−.120*** (.031)		−.036** (.012)
African American		.131*** (.033)		.041 (.029)		−.182** (.062)		−.011 (.020)
Hispanic		.104*** (.027)		−.074† (.038)		.186** (.060)		−.017 (.019)
Retirement		−.093*** (.022)		.066** (.023)		.028 (.035)		.018 (.012)
Widowhood		.117*** (.026)		.036 (.028)		−.166*** (.034)		.069** (.021)
Self-rated health		−.018* (.008)		.045** (.012)		.019 (.012)		.010 (.008)
Constant	7.050*** (.726)	5.905*** (.742)	3.540*** (.094)	3.380*** (.230)	−1.178*** (.122)	−1.339*** (.123)	−.147** (.050)	−.664*** (.072)
Δ of age estimate (F)[e](d.f.)		21.70*** (2, 48)		2.25 (1, 49)		1.50 (1, 49)		7.36** (1, 49)
N	2,896		2,896		2, 900		2, 560	

† p < .10,

* p < .05,

** p < .01,

*** p < .001 (two-tailed tests)

[a] All models are survey-adjusted, and include controls for SES, marital history, functional health, and other predictors listed in Appendix Table A1.

[b] Number of network members is treated as the exposure variable.

[c] Note that this model also includes an interaction b/w age and avg. frequency of interaction w/net members.

[d] Number of possible relationships among network members, given network size, is treated as the exposure variable.

[e] Seemingly unrelated estimation test of whether including the life-course factors significantly alters the association b/w age and connectedness.

Appendix Table A3

Log(odds) from (Generalized) Ordered Logit Models Predicting Weekly Neighborly Socializing, Religious Services Attendance, Volunteering, and Organized Group Involvement among Older Adults (Full Version of In-Text Table 4)[a]

Predictor	Neighborly Socializing		Religious Services		Volunteering		Organized Groups	
Age (in decades)	.254*** (.054)	.078 (.068)	.263*** (.069)	.340*** (.084)	.095† (.052)	.180** (.053)	−.001 (.060)	.120 (.080)
Female		−.091 (.102)		.492*** (.095)		.225* (.093)		.176† (.104)
African American		.200 (.245)		.760*** (.123)		.551** (.150)		.687*** (.153)
Hispanic		.450* (.197)		.397† (.229)		−.086 (.167)		−.006 (.161)
College		−.124 (.113)		.151† (.086)		.467*** (.094)		.778*** (.081)
Retirement		.225* (.100)		.039 (.116)		.209† (.062)		.010 (.120)
Widowhood		.240† (.132)		−.028 (.107)		−.051 (.139)		.139 (.133)
Never married		−.473 (.318)		−.269 (.231)		−.085* (.034)		−.589* (.262)
Number of children		−.024 (.043)		.050† (.026)		−.790* (.295)		−.078† (.042)
Self-rated health		.027 (.056)		.021 (.061)		.176** (.050)		.155** (.052)
Function health		−.012 (.095)		.432*** (.101)		.442*** (.091)		.312** (.095)
Network size		−.038 (.042)		.145** (.041)		.101* (.049)		.081 (.052)
Proportion of network members in household		−.588** (.184)		.451* (.213)		−.129 (.234)		−.332 (.251)
Volume of contact w/ network members		.002 (.002)		.002 (.002)		.004* (.002)		.003 (.002)
Familiarity with neighbors		.809*** (.083)						
Catholic				.196† (.108)				
Jewish				−1.757*** (.447)				
Other religion				.269† (.151)				
No religion				−4.188*** (.801`)				
Inverse Mill's ratio	−.277** (.385)	−.571 (.761)			−2.348*** (.318)	−1.422** (.526)	−2.543*** (.373)	−1.919** (.620)
Constant	−1.933*** (.334)	−2.702*** (.575)	−2.003*** (.481)	−3.947*** (.631)	−1.401*** (.376)	−3.798*** (.513)	−.349*** (.393)	−2.747*** (.531)
Δ of age estimate (F)[b] (d.f.)		12.57*** (1, 49)		1.14 (1, 49)		.74 (1, 49)		.02 (1, 49)
N	2,257		2,878		2,346		2,344	

† p < .10,

* p < .05,

** p < .01,

*** p < .001 (two-tailed tests)

[a] All models are survey-adjusted, and include controls for SES, marital history, functional health, and other predictors listed in Appendix Table A1.

[b] Seemingly unrelated estimation test of whether including the life-course measures significantly alters the association b/w age and connectedness. This test is unavailable for generalized ordered logit, so it is conducted using binary logit models.

Table 4

Log(odds) from (Generalized) Ordered Logit Models Predicting Weekly Neighborly Socializing, Religious Services Attendance, Volunteering, and Organized Group Involvement among Older Adults[a]

Predictor	Neighborly Socializing		Religious Services		Volunteering		Organized Groups	
Age (in decades)	.254*** (.054)	.078 (.068)	.263*** (.069)	.340*** (.084)	.095† (.052)	.180** (.053)	−.001 (.060)	.120 (.080)
Female		−.091 (.102)		.492*** (.095)		.225* (.093)		.176† (.104)
African American		.200 (.245)		.760*** (.123)		.551** (.150)		.687*** (.153)
Hispanic		.450* (.197)		.397† (.229)		−.086 (.167)		−.006 (.161)
Retirement		.225* (.100)		.039 (.116)		.209† (.062)		.010 (.120)
Widowhood		.240† (.132)		−.028 (.107)		−.051 (.139)		.139 (.133)
Self-rated health		.027 (.056)		.021 (.061)		.176** (.050)		.155** (.052)
Constant	−1.933*** (.334)	−2.702*** (.575)	−2.003*** (.481)	−3.947*** (.631)	−1.401*** (.376)	−3.798*** (.513)	−.349*** (.393)	−2.747*** (.531)
Δ of age estimate (F)[b] (d.f.)		12.57*** (1, 49)		1.14 (1, 49)		.74 (1, 49)		.02 (1, 49)
N	2,257		2,878		2,346		2,344	

† p < .10,

* p < .05,

** p < .01,

*** p < .001 (two-tailed tests)

[a] All models are survey-adjusted, and include controls for SES, marital history, functional health, and other predictors listed in Appendix Table A1.

[b] Seemingly unrelated estimation test of whether including the life-course measures significantly alters the association b/w age and connectedness. This test is unavailable for generalized ordered logit, so it is conducted using binary logit models.

Appendix Table A4

Comparison of Sociodemographic Distribution of NSHAP Sample to Estimates from 2005 American Community Survey and 2002 Current Population Survey

Characteristic	NSHAP	2005 ACS	2002 CPS
Gender (female)	51.5	54.4	54.6
Age			
57 – 64	41.3	42.2	44.1
65 – 74	34.9	33.5	33.4
75 – 85	23.8	24.3	22.5
Race/ethnicity			
White	84.9	84.0	86.9[a]
African American	10.0	8.8	9.1
Other	5.0	7.2	--
Hispanic	7.0[b]	6.9	6.6
Education			
Less than high school	18.5	18.8	23.1
High school graduate	27.0	35.5	35.1
Some college/Associate's	30.0	23.1	20.6
Bachelor's or higher	24.5	22.7	21.2
Marital status (married)	66.4	63.1	62.8

[a] Includes Latinos

[b] Based on the question: "Do you consider yourself Hispanic or Latino?"